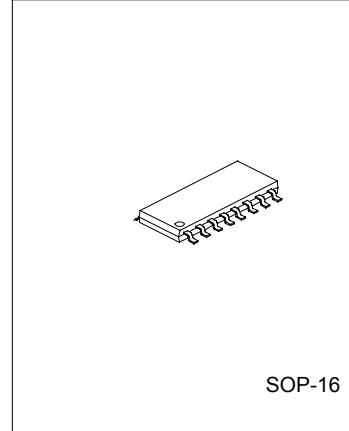


UTC TDA7088 LINEAR INTEGRATED CIRCUIT

FM RECEIVER CIRCUIT FOR BATTERY SUPPLY

DESCRIPTION

The UTC TDA7088 is a bipolar integrated circuit for use in mono portable and pocket radios. It is used when a minimum of peripheral components (of small dimensions and low costs) is important. The circuit contains a frequency-locked-loop(FLL) system with an Intermediate Frequency (IF) of about 70kHz. Selectivity is achieved by active RC-filters. De-tuning related to the IF and too weak input signals is suppressed by the mute circuit.



FEATURES

- *Equipped with all stages of a mono receiver from antenna to audio output.
- *Mute circuit
- *Search tuning with a single varicap diode
- *Mechanical tuning with integrating AFC
- *AM application supported
- *Power supply polarity protection
- *Power supply voltage down to 1.8V

APPLICATIONS

- *Mechanical tuning ; this is possible with or without integrating AFC circuit
- *Electrical tuning; this is realized by one directional (band-up) search tuning facility, including RESET to the lower-band limit.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE		UNIT
		MIN	MAX	
Supply Voltage	Vp	0	5	V
Storage Temperature	Tstg	-55	+150	°C
Operating ambient temperature	Tamb	-10	70	°C
Electrostatic handling; note 1	Ves			

Note 1: There is no special ESD protection circuit built-in; ESD data on request.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range, $V_{CC}=15V$, $f=1kHz$, Unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_p		1.8	3	5	V
Supply Current	I_p		4.2	5.2	6.6	mA
Radio Input Frequency	f_{iRF}		0.5		110	MHz
RF sensitivity input voltage (RMS value)	$V_i(\text{rms})$	$VOAF=-3\text{dB}$, $VOAF=0\text{dB}$ at $V_i=1\text{mV}$, mute off		3	6	μV
Signal handling		$\Delta f=+75\text{kHz}$, $\text{THD}<10\%$	100	200		mV
Audio Output Signal (RMS value)	$V_o(\text{rms})$	$R_L=22\text{k}\Omega$	60	85	120	mV
Operating Ambient Temperature	T_{amb}		-10		70	$^{\circ}\text{C}$

BLOCK DIAGRAM

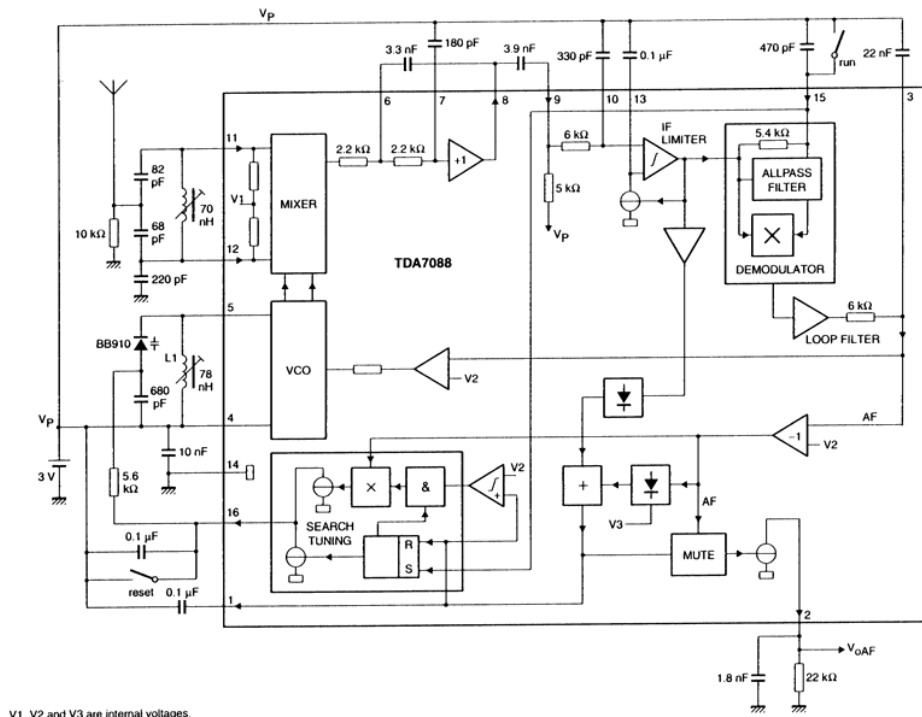


Fig.1 Block diagram and application circuit for search tuning.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

PIN CONFIGURATIONS

PIN	SYMBOL	DESCRIPTION
1	MUTE	Mute output
2	VOAF	Audio frequency output signal
3	LOOP	AF loop filter
4	Vp	+3V supply voltage
5	OSC	Oscillator resonant circuit
6	IFFB	IF feedback
7	CLP1	Low-pass capacitor of 1 dB amplifier
8	VOIF	IF output to external coupling capacitor (high-pass)
9	VILF	IF input to limiter amplifier
10	CLP2	Low-pass capacitor of IF limiter amplifier
11	VIRF	Radio frequency input
12	CIRF	Radio frequency input
13	CLIM	Limiter offset voltage capacitor
14	GND	Ground(0V)
15	CAP	All-pass filter capacitor/input for search tuning
16	TUNE	Electrical tuning/AFC output

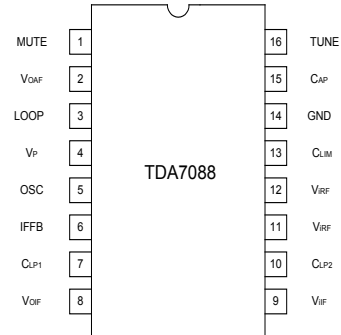


Fig.2

DC CHARACTERISTICS

Vp=3V, Tamb=25°C, unless otherwise specified.

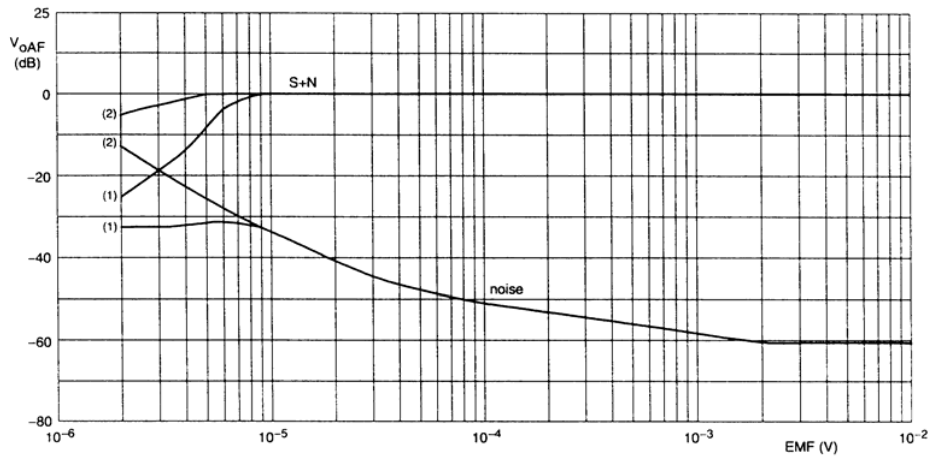
PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage (pin4)	Vp	1.8	3	5	V
Supply Current (pin4)	Ip	4.2	5.2	6.6	mA
DC voltage on pin1	V1	2.5	2.55	2.6	V
DC voltage on pin3	V3	2.64	2.69	2.74	V
DC voltage on pins 6 and 7	V6,7	2.38	2.44	2.5	V
DC voltage on pin 8	V8	1.6	1.67	1.74	V
DC voltage on pin 9,10 and 13	V9,10,13	2.42	2.47	2.52	V
DC voltage on pins 11 and 12	V11,12	0.91	0.94	0.98	V
DC voltage on pin 15	V15	2.06	2.12	2.18	V
AF output current on pin2	I2	45	60	80	μA
Oscillator current on pin5	I5	275	375	500	μA

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

AC CHARACTERISTICS

V_p=3V, T_{amb}=25°C, f_{IRF}=96MHz modulated with f_{mod}=1kHz and +22.5kHz deviation; V_i=400μV (measured as EMF, R_s=75Ω) and measurements taken in Fig.4; unless otherwise specified.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
RF sensitivity input voltage (RMS value)	V _i (rms)	VOAF=-3dB; VOAF=0dB at V _i =1mV; see Fig.3				
		Mute off	3	3	6	μV
		Mute on	3	6	12	μV
		(S+N)/N =26dB		5	10	μV
Signal handling	V _i (rms)	Δf=+-75kHz, THD<10%	100	200		mV
Signal plus noise-to-noise ratio	(S+N)/N	See Fig.3	52	56		dB
Total harmonic distortion	THD	Δf=+-22.5kHz		1	1.4	%
		Δf=+-75kHz		2.4	3.3	%
AM suppression	αAM	FM:1kHz, +-75kHz, AM:1kHz, m=0.8	47	52		dB
Ripple rejection	RR1000	100mV RMS ripple on V _p , f=1kHz	7	10		dB
Audio output signal (RMS value)	V _o (rms)	R _L =22kΩ	60	85	120	mV
Search Tuning (with BB910 and C16=0.1μF) see Fig.1						
Minimum output voltage on pin16	V16	Limiting point		V _p - 1.85		V
Tuning steepness	ΔV/Δt	Voltage at pin16	95	210	420	mV/s
Oscillator steepness	ΔF _{osc} /Δt		1.25	2.83	5.6	MHz/s
AFC steepness	ΔIAFC/ΔV3	Voltage at pin3	4.75	9.5	19	μS

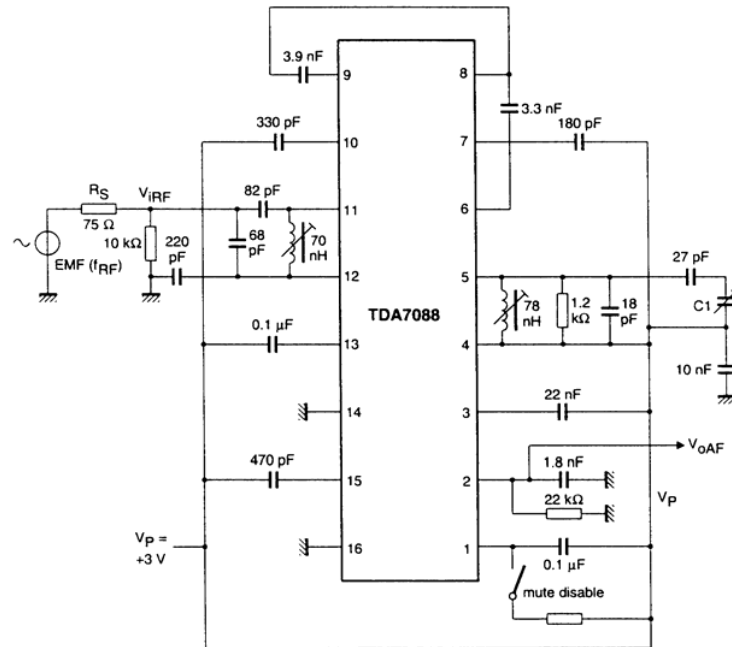


(1) Mute on.
(2) Mute off.

Fig.3 Input sensitivity.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT

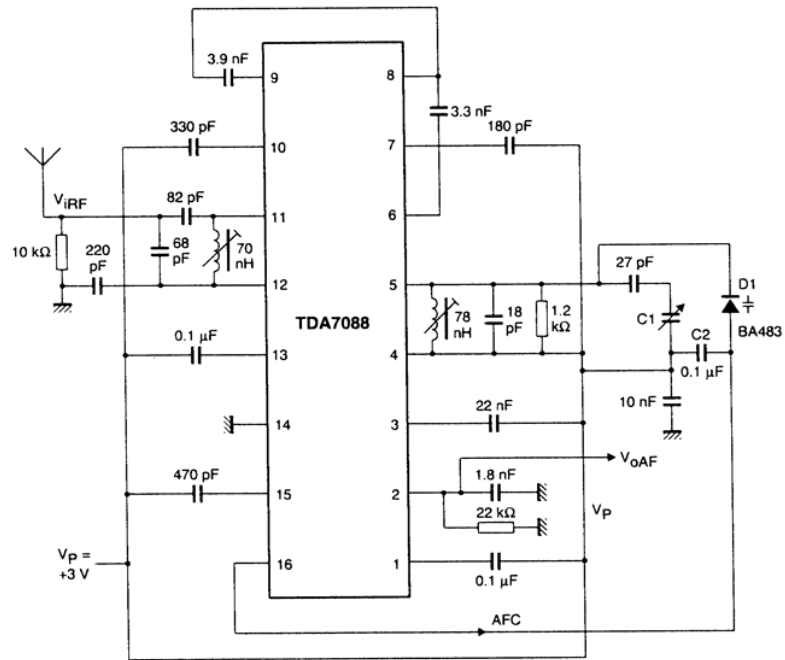
TEST CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.4 Test circuit and application for mechanical tuning.

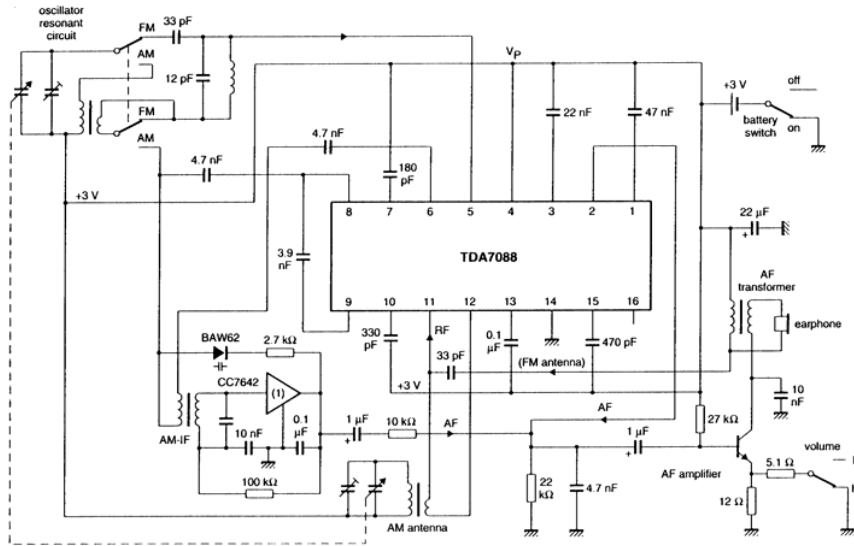
UTC TDA7088 LINEAR INTEGRATED CIRCUIT



C1 = Toko 2A-15BT-R01.

Fig.5 Application circuit with AFC for mechanical tuning.

UTC TDA7088 LINEAR INTEGRATED CIRCUIT



(1) CC7642: AM-IF amplifier/demodulator type number WU-xi 742 Fty.

Fig 6 AM application circuit.

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QW-R110-016,A